



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/669,969	09/26/2000	William Henry Pettit	H-203484	3594

7590

05/16/2005

Cary W Brooks  
General Motors Corporation  
Legal Staff  
P O Box 300 Mail Code 482 C23 B21  
Detroit, MI 48265-3000

EXAMINER

MARTIN, ANGELA J

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 05/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/669,969

Applicant(s)

PETTIT, WILLIAM HENRY

Examiner

Angela J. Martin

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 March 2005.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.  
4a) Of the above claim(s) 10-13, 19-34, 40 and 41 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-9, 14-18 and 35-39 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

This Office Action is responsive to the Amendment filed on March 2, 2005. The Applicant has withdrawn non-elected claims 10-13, 19-34, and 40-41. The Applicant has amended claims 1-3, 14, 17, 18, 35, 36, 38, 39. However, the Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, this action is made final.

#### ***Claim Objections***

1. Claim 7 is objected to because of the following informalities: Alternative expressions are permitted if they present no uncertainty or ambiguity with respect to the question of scope or clarity of the claims. One acceptable form of alternative expression, which is commonly referred to as a Markush group, recites members as being "selected from the group consisting of A, B and C." See *Ex parte Markush*, 1925 C.D. 126 (Comm'r Pat. 1925). Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Art Unit: 1745

3. Claims 1-7, 9, 14-18, 35-39 are rejected under 35 U.S.C. 102(e) as being anticipated by Loffler et al., U.S. Pat. Application Pub. 2002/0071797 A1.

Rejection of claims 1-7, 9, 14-18, 35-39 drawn to a fuel cell system.

Loffler et al., teach a fuel cell system comprising a reaction vessel having a catalyst carried in the vessel for endothermic reaction, and comprising at least a first and second heat exchanger spaced apart from each other within the vessel, and wherein the devices are independently controlled so that heat transferred by the heat exchangers to the catalyst, and the temperature of the catalyst, may be varied at different locations within the reaction vessel corresponding to the location of the heat exchanger devices, and wherein the reaction vessel comprises a plurality of parallel substrates, each of the substrates having a first and second surface, and an endothermic reaction catalyst overlying the first surface, and an exothermic reaction catalyst overlying the second surface, and wherein each of the substrates is constructed and arranged to transfer heat from the second surface to the first surface (sect. 0013). It teaches exothermic reactants comprising a fuel and oxidant, and each of the heat exchangers includes at least one combustion chamber (sect. 0013), and at least one fuel and oxidant are selectively charged to each combustion chamber in a controlled amount so that heat generated by each of the heat exchanger devices may be varied as desired (sect. 0013). It also teaches a plurality of endothermic reaction sections and a plurality of heat transfer devices, wherein each endothermic reaction section has a heat transfer device associated therewith to supply sufficient heat to control the temperature profile of the associated endothermic reaction section within a predetermined range,

Art Unit: 1745

and wherein each endothermic reaction section comprises a substrate shared by an adjacent heat transfer device (sects. 0012, 0053). Additionally, it teaches the endothermic reaction sections are spaced apart and the heat transfer device is positioned between two spaced apart endothermic reaction sections (sect. 0011). It teaches each heat transfer device comprises at least one catalytic combustion chamber having a catalyst (sect. 0011-0013). It also teaches the combustion fuel mixture comprises an anode and cathode exhaust (sect. 0046). In addition, it teaches endothermic reaction section includes a catalyst supported on metal (sect. 0011; 0035; 0041; 0044). It also teaches the exhaust from a first endothermic reaction section flows over a heat transfer device before flowing into a second endothermic reaction section (p. 8, claim 1). It also teaches a fuel cell system comprising a reaction vessel integrating an exothermic and endothermic reaction, the vessel including a plurality of substrates, each having a first and second surface, and an endothermic reaction catalyst overlying the first surface, and an exothermic reaction catalyst overlying the second surface, and wherein the substrates are constructed and arranged to transfer heat from the second surface to the first surface (abstract). It also teaches the first and second surfaces are on opposite sides of the substrate (sect. 0013); wherein the substrate is substantially flat planar (Fig. 1-3). It teaches a fuel cell system comprising an integrated exothermic and endothermic reaction vessel having a plurality of exothermic and endothermic reaction chambers, and a substrate separating the chambers, wherein the substrate has a first surface facing toward the exothermic chamber and including an exothermic reaction catalyst overlying the first surface, and the substrate has a second surface

Art Unit: 1745

facing toward endothermic reaction chamber and including an endothermic reaction catalyst overlying the second surface, and the reactants may be selectively supplied to the exothermic chamber to produce reaction products and heat, and at least a portion of the heat is transferred through the substrate to the second surface to drive an endothermic reaction (sect. 0013). It teaches a fuel cell system comprising an integrated chemical combustion and fuel reformation vessel and a substrate separating the chambers, including a combustion catalyst overlying the first surface and a reformation catalyst overlying the second surface, and supplying combustion reactants to the chemical combustion chamber to produce combustion products and heat, and at least a portion of the heat is transferred through the substrate to the second surface to selectively reform a desired amount of fuel supplied to the fuel reformation chamber (sect. 0011-0013; 0030-0033). It also teaches a fuel cell system comprising a reaction vessel including a plurality of vaporizer sections (sect. 0051) and a plurality of heat transfer devices (sect. 0001) and a plurality of endothermic reaction sections, and a plurality of heat transfer devices, wherein each endothermic section has a heat transfer device associated therewith to supply sufficient heat to control the temperature profile of the associated endothermic reaction section within a predetermined range, and wherein each endothermic reaction section comprises a substrate shared by an adjacent exothermic reaction section (sect. 0051-0056). It teaches a plurality of endothermic and exothermic reaction sections, wherein the exothermic reaction section includes a catalyst for combusting a fuel (abstract); exothermic section charges hydrogen and

Art Unit: 1745

oxygen into the exothermic reaction section and section is constructed and arranged to conduct a preferential oxidation (sect. 0001, 0071).

Thus, the claims are anticipated.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Loffler et al., U.S. Pat. Application Pub. 2002/0071797 A1, in view of Lesieur, U.S. Pat. No. 6,707,244 B1.

Rejection of claim 8 drawn to a fuel cell system.

Loffler et al., teach a fuel cell system as described above.

Lesieur teaches a fuel cell system wherein endothermic reaction sections include catalyst supported on a foam (col. 2, lines 32-41).

Thus, it would have been obvious at the time the invention was made to insert the teachings of Lesieur into the teachings of Loffler et al., because a foam support provides an increased surface area, which provides enhanced catalytic activity.

***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Angela J. Martin whose telephone number is 571-272-1288. The examiner can normally be reached on Monday-Friday from 9:00 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



Art Unit: 1745

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
AJM

**GREGG CANTELMO**  
**PRIMARY EXAMINER**

